All India Test Series (2023-24)

Test Code: ANY/09 | **AITS TEST - 09** | **YAKEEN NEET**

DURATION: 200 Minutes | **DATE: 21/04/2024** | **M. MARKS: 720**

ANSWER KEY

(PHYSICS)

SECTION-A

1.	(4)	8.	(1)	15.	(3)	22.	(3)	29.	(4)
2.	(1)	9.	(3)	16.	(4)	23.	(4)	30.	(3)
3.	(3)	10.	(2)	17.	(4)	24.	(2)	31.	(3)
4.	(1)	11.	(3)	18.	(2)	25.	(3)	32.	(4)
5.	(4)	12.	(3)	19.	(4)	26.	(2)	33.	(2)
6.	(4)	13.	(4)	20.	(3)	27.	(3)	34.	(4)
7.	(3)	14.	(2)	21.	(2)	28.	(1)	35.	(2)

SECTION-B

36.	(4)	39.	(3)	42.	(3)	45.	(4)	48.	(2)
37.	(3)	40.	(4)	43.	(3)	46.	(4)	49.	(1)
38.	(3)	41.	(3)	44.	(1)	47.	(1)	50.	(2)

(CHEMISTRY)

SECTION-A

51.	(4)	58.	(2)	65.	(3)	72.	(4)	79.	(1)
52.	(2)	59.	(4)	66.	(3)	73.	(2)	80.	(4)
53.	(4)	60.	(4)	67.	(1)	74.	(4)	81.	(2)
54.	(2)	61.	(2)	68.	(2)	75.	(3)	82.	(4)
55.	(3)	62.	(2)	69.	(4)	76.	(1)	83.	(3)
56.	(2)	63.	(2)	70.	(1)	77.	(4)	84.	(1)
57.	(1)	64.	(1)	71.	(3)	78.	(3)	85.	(4)

SECTION-B

86.	(1)	89.	(1)	92.	(2)	95.	(3)	98.	(3)
87.	(3)	90.	(3)	93.	(4)	96.	(2)	99.	(3)
88.	(3)	91.	(1)	94.	(1)	97.	(1)	100.	(3)

(BOTANY)

SECTION-A

101.	(1)	108.	(2)	115.	(2)	122.	(1)	129.	(3)
102.	(3)	109.	(2)	116.	(3)	123.	(2)	130.	(4)
103.	(4)	110.	(3)	117.	(1)	124.	(1)	131.	(1)
104.	(2)	111.	(4)	118.	(2)	125.	(2)	132.	(4)
105.	(4)	112.	(3)	119.	(2)	126.	(1)	133.	(4)
106.	(1)	113.	(2)	120.	(4)	127.	(3)	134.	(2)
107.	(3)	114.	(2)	121.	(1)	128.	(1)	135.	(4)

SECTION-B

136.	(2)	139.	(3)	142.	(3)	145.	(4)	148.	(2)
137.	(3)	140.	(1)	143.	(3)	146.	(1)	149.	(1)
138.	(2)	141.	(3)	144.	(1)	147.	(2)	150.	(3)

(ZOOLOGY)

SECTION-A

151.	(3)	158.	(2)	165.	(2)	172.	(2)	179.	(3)
152.	(2)	159.	(2)	166.	(2)	173.	(3)	180.	(3)
153.	(4)	160.	(3)	167.	(4)	174.	(3)	181.	(2)
154.	(2)	161.	(2)	168.	(3)	175.	(4)	182.	(4)
155.	(4)	162.	(2)	169.	(1)	176.	(3)	183.	(2)
156.	(3)	163.	(3)	170.	(1)	177.	(4)	184.	(4)
157.	(2)	164.	(4)	171.	(1)	178.	(4)	185.	(3)

SECTION-B

186.	(3)	189.	(4)	192.	(3)	195.	(2)	198.	(3)
187.	(1)	190.	(1)	193.	(2)	196.	(1)	199.	(4)
188.	(4)	191.	(1)	194.	(1)	197.	(3)	200.	(3)

Hints & Solutions

[AITS-09 | Yakeen-NEET | 21-04-2024]

(PHYSICS)

SECTION-A

1. (4)

For the change in internal energy of the gas;

$\Delta U = nC_v\Delta T$

This can be applied in any process, whether it is isobaric, isothermal, adiabatic or else.

(NEW NCERT 11th Page No. 230, 231)

2. (1)

For argon: It is monatomic, therefore it has 3 degrees of freedom

$(\text{K.E.})_{\text{argon}} = \frac{3}{2}k_BT$ (For one molecule)

For nitrogen gas, number of degrees of freedom is 5

$\therefore (\text{K.E.})_{\text{nitrogen}} = \frac{5}{2}k_BT$ (For one molecule)

Hence ratio of their K.E. $= \frac{\frac{5}{2}k_BT}{\frac{3}{2}k_BT} = \frac{5}{3}$

(NEW NCERT 11th Page No. 252, 253)

3. (3)

Total energy, T.E. = – 3.4 eV

Kinetic energy, K.E. = – T.E. = 3.4 eV

Potential energy, P.E. = – 2 K.E. = – 6.8 eV

(NEW NCERT 12th Page No. 297, 298 and 299)

4. (1)

The bulb will glow only when both the switches are closed. The truth table for the given circuit is:

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

This represents AND gate.

(OLD NCERT 12th Page No. 491, 492, 493 and 494)

5. (4)

Angular impulse = change in angular momentum

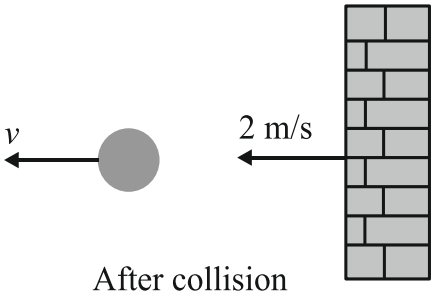
$(\tau t = I\omega - 0)$

$\Rightarrow \omega = \frac{\tau t}{I} = \frac{FRt}{I} = \frac{40\times 0.4\times 4}{0.4} = 160$ rad/s

(NEW NCERT 11th Page No. 121, 122 and 123)

6. (4)

The speed of wall will not change after the collision, So, let v be the velocity of the ball after collision in the direction shown in figure.



After collision

Since, collision is elastic (e = 1).

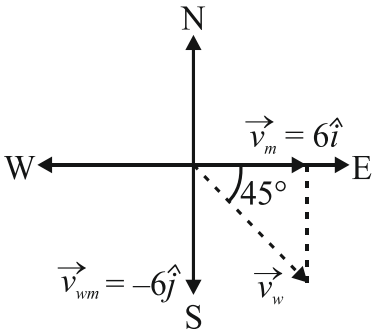
Separation speed = approach speed

or $v - 2 = 4 + 2$

or v = 8 m/s

(NEW NCERT 11th Page No. 83, 84, 85 and 86)

7. (3)



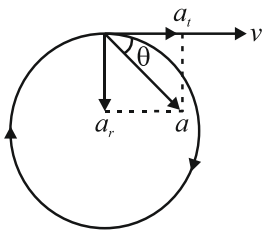
$\vec{v}_w = \vec{v}_{wm} + \vec{v}_m = -6\hat{j} + 6\hat{i}$

$\vec{v}_w = 6\hat{i} - 6\hat{j}$

$|\vec{v}| = 6\sqrt{2}$ m/s and it is blowing along S – E

(NEW NCERT 11th Page No. 35, 36 and 37)

8. (1)



θ is acute

Accelerated circular motion is one in which velocity, v and angular velocity, ω are increasing. Therefore, tangential acceleration, a_t is in the direction of velocity.

Radial acceleration, a_r is towards the centre.

So, the net acceleration is making an angle θ with velocity as shown in figure.

$$\tan\theta = \frac{a_r}{a_t}$$

In this case, θ is always acute.

(NEW NCERT 11th Page No. 40, 41 and 42)

9. (3)

For particle starting SHM from mean position

$$y = A\sin\omega t \qquad \Rightarrow \frac{\sqrt{3}A}{2} = A\sin(\omega\times 1)$$

$$\Rightarrow \sin\omega = \sin\frac{\pi}{3} \Rightarrow \omega = \frac{\pi}{3}$$

$$\Rightarrow T = \frac{2\pi}{\omega} = \frac{2\pi\times 3}{\pi} = 6\,\text{s}$$

(NEW NCERT 11th Page No. 262, 263 and 264)

10. (2)

From the Faraday's law,

Magnitude of induced emf, $|e| = \frac{N\Delta\phi}{\Delta t} = (NA)\frac{\Delta B}{\Delta t}$

$$= \frac{(250)(20\times 10^{-2})^2(0.5-0)}{2} = 2.5\,\text{V}$$

Induced current, $i = \frac{|e|}{R} = \frac{2.5}{2} = 1.25\,\text{A}$

(NEW NCERT 12th Page No. 157, 158 and 159)

11. (3)

Maximum particle velocity is ωA and wave velocity is $\frac{\omega}{k}$.

Now, given that

Maximum particle velocity = 3 × (wave velocity)

or $\omega A = 3\left(\frac{\omega}{k}\right)$

$$\therefore\ A = \frac{3}{k}$$

(NEW NCERT 11th Page No. 268, 269)

12. (3)

Soap bubble has two surfaces. Hence,

Here, $\Delta A = 2[4\pi\{(2.0\times 10^{-2})^2 - (1.0\times 10^{-2})^2\}]$

$= 24\pi\times 10^{-4}\,\text{m}^2$

Work done, $W = T\Delta A$ $\qquad \left(T = \frac{\Delta W}{\Delta A}\right)$

$$\therefore\ W = (3.0\times 10^{-2})(24\pi\times 10^{-4})$$

$$= 72\pi\times 10^{-6}\,\text{J}$$

(NEW NCERT 11th Page No. 192, 193, 194, 195, 196 and 194)

13. (4)

On increasing the temperature, all the dimensions increase. Hence, the size of the plate as well as the cavity increases.

(NEW NCERT 11th Page No. 204, 205, 206 and 207)

14. (2)

$\frac{m\omega^2\ell}{A}$ = breaking stress (BS)

$$\Rightarrow \omega = \sqrt{\frac{(BS)A}{m\ell}} = \sqrt{\frac{9.6\times 10^7\times 10^{-6}}{10\times 0.6}} = 4\,\text{rad/s}$$

(NEW NCERT 11th Page No. 170, 171, 172, 173 and 174)

15. (3)

$$Q = \frac{KA(T_1 - T_2)t}{L}$$

For same insulation by the brick and cement:

Q, A, $(T_1 - T_2)$ and t do not change.

Hence, $\frac{K}{L}$ remain constant.

If K_1 and K_2 be the thermal conductivities of brick and cement respectively and L_1 and L_2 are the required thickness, then

$$\frac{K_1}{L_1} = \frac{K_2}{L_2} \text{ or } \frac{1.5}{15} = \frac{3.0}{L_2}$$

$$\therefore\ L_2 = \frac{3.0\times 15}{1.5} = 30\,\text{cm}$$

(NEW NCERT 11th Page No. 208, 209)

16. (4)

Given that:

$\frac{2}{5}MR^2 = 30 \Rightarrow MR^2 = 75$ kg-m^2

By theorem of parallel axes,

$$I = I_{CM} + MR^2 = \frac{2}{5}MR^2 + MR^2$$

$$= \frac{7}{5}MR^2 = \frac{7}{5}\times 75 = 105\,\text{kg-m}^2.$$

(NEW NCERT 11th Page No. 114, 115 and 116)

17. (4)

Given:

$\theta_1 = (42.4 \pm 0.3)°C$ and $\theta_2 = (75.3 \pm 0.2)°C$

Rise in temperature, $\theta = \theta_2 - \theta_1 =$

$(75.3 - 42.4)°C = 32.9°C$

$\Delta\theta = \pm(\Delta\theta_1 + \Delta\theta_2) = \pm(0.3 + 0.2) = \pm 0.5°C$

$\therefore$ Rise in temperature = $(32.9 \pm 0.5)°C$

(NEW NCERT 11th Page No. 3, 4, 5 and 6)

18. (2)

Given: $mg = 60$ N

$$\Rightarrow g' = g\left(1 - \frac{d}{R}\right)$$

$$d = \frac{R}{3}$$

$$\Rightarrow \frac{d}{R} = \frac{1}{3}$$

$$\therefore\ g' = g\left(1 - \frac{1}{3}\right) = \frac{2g}{3}$$

$$\therefore\ mg' = \frac{2mg}{3} = \frac{2 \times 60}{3} = 40 \text{ N}$$

(NEW NCERT 11th Page No. 133, 134)

19. (4)

A changing electric field in a region produces displacement current and moving charge produces conduction current. A magnetic field is produced due to such types of current. The source of electromagnetic wave is an accelerating charge.

(NEW NCERT 12th Page No. 202, 203 and 204)

20. (3)

$$F = qE = q\left(\frac{\sigma}{2\varepsilon_0}\right) = q\left(\frac{q}{2A\varepsilon_0}\right)$$

As q will not change

$\therefore$ F = constant

(NEW NCERT 12th Page No. 68 and 69)

21. (2)

At $t = \frac{T}{6}$

$$x = A\sin\frac{2\pi}{T} \times \frac{T}{6} = A\sin\frac{\pi}{3} = \frac{\sqrt{3}}{2}\text{A}$$

$$\text{So, K.E.} = \frac{1}{2}k(A^2 - x^2) = \frac{1}{4} \times \frac{1}{2}kA^2$$

$$\text{and P.E.} = \frac{1}{2}kx^2 = \frac{1}{2} \times k \times \frac{3A^2}{4}$$

$$\therefore\ \frac{\text{K.E.}}{\text{P.E.}} = \frac{1}{3}$$

(NEW NCERT 11th Page No. 268, 269)

22. (3)

$$E_0 = \frac{2k\lambda}{R}\sin\frac{\alpha}{2}$$

Now substituting the given values.

$$E_0 = \frac{2 \times 9 \times 10^9 \times 1.8 \times 10^{-9}}{2}\sin\frac{60°}{2}$$

$$= 16.2 \times \sin 30° = 8.1 \text{ N/C}$$

(NEW NCERT 12th Page No. 14, 15 and 16)

23. (4)

Apparent power = 100 × 20 = 2000 W

$\therefore$ Power factor

$$\cos\phi = \frac{\text{True Power}}{\text{Apparent power}} = \frac{1000}{2000} = \frac{1}{2}$$

Wattless current

$$= I_{rms}\sin\phi = 20\sqrt{1 - \left(\frac{1}{2}\right)^2}$$

$$= 20 \times \frac{\sqrt{3}}{2} = 10\sqrt{3}\text{A}$$

(NEW NCERT 12th Page No. 190, 191, 192 and 193)

24. (2)

In parallel combination of bulbs

Brightness $\propto$ power consumed by bulb $\propto I \propto \frac{1}{R}$

$\Rightarrow$ Bulb of greater wattage will shine more.

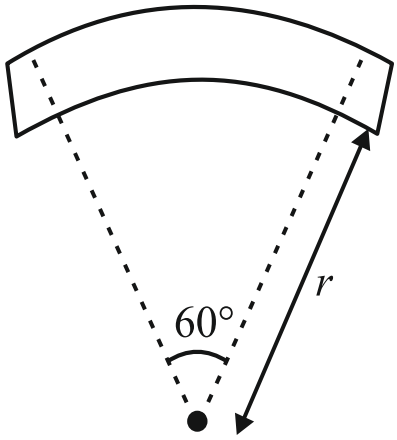
(NEW NCERT 12th Page No. 92, 93)

25. (3)

Let m be strength of each pole of bar magnet of length ℓ. Then

$M = m \times \ell$ …(1)

When the bar magnet is bent in the form of an arc as shown in figure, then;



Here arc length, $l = r\theta \left(\theta = \frac{\pi}{3}\right)$

So, $l = \frac{\pi}{3} \times r = \frac{\pi r}{3}$

or $r = \frac{3l}{\pi}$

New magnetic dipole moment

$M' = m \times 2r \sin 30°$

$= m \times 2 \times \frac{3l}{\pi} \times \frac{1}{2} = \frac{3ml}{\pi} = \frac{3M}{\pi}$

(NEW NCERT 12th Page No. 137, 138, 139, 140 and 141)

26. (2)

Displacement in the direction of force is:

$d = \frac{1}{2}at^2 = \frac{1}{2}\frac{F}{m}t^2 \quad \left(\because s = ut + \frac{1}{2}at^2\right)$

So, work done is

$W = Fd = \frac{1}{2}\frac{F^2}{m}t^2 = \frac{1}{2} \times \frac{6^2}{12} \times 1^2 = 1.5\,\text{J}$

(NEW NCERT 11th Page No. 75, 76)

27. (3)

If refractive index of medium < refractive index of lens

Or $\mu_M < \mu_L$ then $\frac{\mu_L}{\mu_m} > 1$ or $\left(\frac{\mu_L}{\mu_m} - 1\right) > 0$

Convex lens behaves as convergent lens.

(NEW NCERT 12th Page No. 234, 235)

28. (1)

$B_o = \frac{\mu_0 I \alpha}{4\pi R}$ (α is in radians)

$\therefore\ B_o = \frac{4\pi \times 10^{-7} \times 2}{4\pi \times 2} \times \frac{\pi}{4} = \frac{\pi}{4} \times 10^{-7} T$

(NEW NCERT 12th Page No. 115, 116)

29. (4)

The tangential acceleration of the particle is

$a_t = \frac{dv}{dt} = \frac{6.0 - 4.0}{4.0} = 0.5\ \text{m/s}^2$

The angular acceleration is;

$\alpha = \frac{a_t}{r} = \frac{0.5}{0.2} = 2.5\,\text{rad/s}^2$

(NEW NCERT 11th Page No. 63, 64)

30. (3)

The focal length of a spherical mirror $\left(f = \frac{R}{2}\right)$ depends only on its radius and is independent of the wavelength of light and refractive index of medium. Hence, it follows that the focal length of a spherical mirror in air or any medium for red or violet light is the same.

(NEW NCERT 12th Page No. 223)

31. (3)

Flux through sphere S_1, $\phi_1 = \frac{\text{charge}}{\epsilon_0} = \frac{2Q}{\epsilon_0}$ and flux through sphere S_2, $\phi_2 = \frac{2Q + 4Q}{\epsilon_0} = \frac{6Q}{\epsilon_0}$

$\therefore$ Ratio $\frac{\phi_1}{\phi_2} = \frac{\frac{2Q}{\epsilon_0}}{\frac{6Q}{\epsilon_0}} = \frac{1}{3}$

(NEW NCERT 12th Page No. 33, 34 and 35)

32. (4)

E = 8.5 V, R = 160 Ω

Voltage drop across p-n junction = 0.5 V

Effective voltage in the circuit V = 8.5 – 0.5 = 8.0 V

Current in the circuit $I = \frac{V}{R} = \frac{8.0}{160} = 0.05\text{A} = 50\ \text{mA}$

(NEW NCERT 12th Page No. 334, 335, 336 and 337)

33. (2)

$\mu = \frac{1}{\sin\theta_c} = \frac{1}{\sin 45°} = \sqrt{2}$

Velocity of light in the medium is

$v_{\text{medium}} = \frac{c}{\mu} = \frac{3 \times 10^8}{\sqrt{2}} = 1.5\sqrt{2} \times 10^8\ \text{ms}^{-1}.$

(NEW NCERT 12th Page No. 229, 230, 231 and 232)

34. (4)

Temperature is constant,

so, $P_1V_1 = P_2V_2 \therefore P_2 = P_1\frac{V_1}{V_2} = 3\left[\frac{600}{400}\right] = 4.5\,\text{atm}$

(NEW NCERT 11th Page No. 233, 234 and 235)

35. (2)

Amplitude of the oscillating magnetic field,

$$B_0 = \frac{E_0}{c} = \frac{57\,\text{V/m}}{3\times10^8\,\text{m/s}} = 1.9\times10^{-7}\,\text{T}$$

(NEW NCERT 12th Page No. 205, 206 and 207)

SECTION-B

36. (4)

$$M = \frac{\mu_0 N_1 N_2 A}{l} = \frac{4\pi\times10^{-7}\times300\times400\times20\times10^{-4}}{0.40}$$

$= 2.4\pi \times 10^{-4}$ H

(NEW NCERT 12th Page No. 164, 165, 166, 167, 168 and 169)

37. (3)

Energy is released when total binding energy of the nucleus (= binding energy per nucleon × number of nucleons) is increased or when total binding energy of products is more than the reactants.

For the process: W → 2X

Binding energy of reactants =120 × 7.5 = 900 MeV and binding energy of products

= 2 (60 × 8.5) =1020 MeV

Therefore, energy released = binding energy of products − binding energy of reactants

= 1020 MeV – 900 MeV = 120 MeV

(NEW NCERT 12th Page No. 310, 311, 312 and 313)

38. (3)

From the law of conservation of momentum,

$p_1 = p_2$ (in opposite directions)

Now, de-Broglie wavelength is given by

$\lambda = \frac{h}{p}$, where h = Planck constant

Since magnitude of momentum (p) of both the particles is equal therefore $\lambda_1 = \lambda_2$

or $\frac{\lambda_1}{\lambda_2} = 1$

(NEW NCERT 12th Page No. 284, 285 and 286)

39. (3)

Acceleration of the system $a = \frac{F}{m_1 + m_2 + m_3}$

$$= \frac{150}{2+10+18} = 5\,\text{m/s}^2$$

$T_1 = m_1 a = 2\times5 = 10\,\text{N}$

$T_2 = (m_1 + m_2)a = (2+10)5 = 60\,\text{N}$

Ratio, $T_1 : T_2 = 1 : 6$

(NEW NCERT 11th Page No. 64, 65 and 66)

40. (4)

From equation of continuity

$A_1 v_1 = A_2 v_2$

$(4\times10^{-4})\left(\frac{0.15}{60}\right) = (50\times10^{-8})v_2$

$\Rightarrow v_2 = 2$ m/s

(NEW NCERT 11th Page No. 187, 188, 189 and 190)

41. (3)

Two forces are equal and opposite.

(NEW NCERT 12th Page No. 6, 7, 8 and 9)

42. (3)

For any charge distribution: Magnetic moment $= \left(\frac{q}{2m}\right) \times$ (angular momentum)

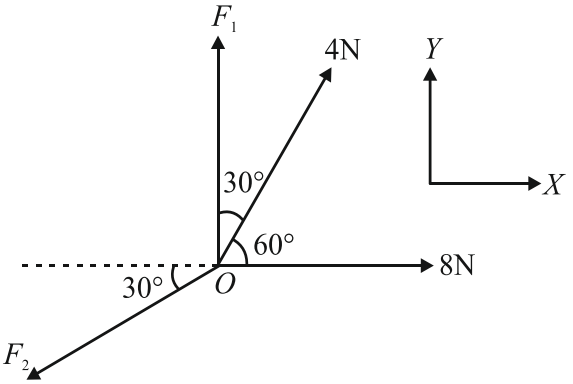
$\because \frac{M}{L} = \frac{q}{2m}$

$\therefore M = \left(\frac{q}{2m}\right)L = \left(\frac{q}{2m}\right)(I\omega)$

$= \left(\frac{q}{2m}\right)\left(\frac{1}{2}mR^2\right)(\omega) = \frac{qR^2\omega}{4}$

(NEW NCERT 12th Page No. 124, 125, 126, 127, 128 and 129)

43. (3)



The object is in equilibrium. Hence,

(i) $\Sigma F_x = 0$

$\therefore 8 + 4\cos60° - F_2\cos30° = 0$

or $8 + 2 - F_2\frac{\sqrt{3}}{2} = 0$

or $F_2 = \frac{20}{\sqrt{3}}$ N

(ii) $\Sigma F_y = 0$

$\therefore\ F_1 + 4\sin 60° - F_2 \sin 30° = 0$

or $F_1 + \frac{4\sqrt{3}}{2} - \frac{F_2}{2} = 0$

or $F_1 = \frac{F_2}{2} - 2\sqrt{3} = \frac{10}{\sqrt{3}} - 2\sqrt{3}$

or $F_1 = \frac{4}{\sqrt{3}}$ N

$\therefore$ The ratio $\frac{F_1}{F_2} = \frac{\frac{4}{\sqrt{3}}\text{N}}{\frac{20}{\sqrt{3}}\text{N}} = \frac{4}{20} = \frac{1}{5}$

(NEW NCERT 11th Page No. 58, 59)

44. (1)

All surfaces are smooth. Therefore, mechanical energy of the system will remain conserved.

$\therefore$ Decrease in PE of both the blocks = increase in KE of both the blocks

$\therefore\ (mgr) + (2mg)\left(\frac{\pi r}{2}\right) = \frac{1}{2}(m+2m)v^2$

or $v = \sqrt{\frac{2}{3}(1+\pi)gr}$

(NEW NCERT 11th Page No. 78, 79)

45. (4)

Path difference $171.5\lambda = \frac{343}{2}\lambda$ = odd multiple of half wavelength.

It means dark fringe is observed

According to equation: $0.01029 = \frac{343}{2}\lambda$

$\Rightarrow \frac{0.01029 \times 2}{343} = 6 \times 10^{-5}$ cm

$\Rightarrow \lambda = 6000$ Å

(NEW NCERT 12th Page No. 265, 266)

46. (4)

Total mechanical energy = $E_0 - 2E_0 = -E_0$.

Since, it is negative, it will not escape to infinity.

$E_i = E_f \Rightarrow E_0 - 2E_0 = 0 + U$

$\Rightarrow$ U = $-E_0$

(NEW NCERT 11th Page No. 138, 139)

47. (1)

$Y = \frac{\frac{F}{A}}{\frac{\Delta\ell}{\ell}} \Rightarrow \Delta\ell = \frac{F\ell}{AY} = \frac{F\ell}{\pi r^2 Y}$

$\frac{\Delta\ell_1}{\Delta\ell_2} = \frac{4F\ell_1}{\pi d_1^2 Y} \times \frac{\pi d_2^2 Y}{4F\ell_2}$

$= \frac{\ell_1}{\ell_2} \times \frac{d_2^2}{d_1^2} = \frac{1}{3} \times \frac{(3)^2}{1} = 3:1$

(NEW NCERT 11th Page No. 170, 171, 172, 173 and 174)

48. (2)

v_A = Slope of $A = \frac{2}{5} = 0.4$ m/s

v_B = Slope of $B = \frac{12}{5} = 2.4$ m/s

$\therefore\ v_{AB} = v_A - v_B = -2$ m/s

(NEW NCERT 11th Page No. 17, 18, 19, 20 and 21)

49. (1)

$a_{COM} = \frac{m_1 a_1 + m_2 a_2}{m_1 + m_2}$

Here, $a_1 = a_2 = g$ (downwards)

$\therefore\ a_{COM} = \frac{(2)(g) + (4)(g)}{2+4} = g$ (downwards)

(NEW NCERT 11th Page No. 99, 100)

50. (2)

$V_A = 0$ V (As it is earthed)

$V_C - V_A = 5$ V

$\therefore\ V_C = 5$ V

$V_B - V_A = 2$ V

$\therefore\ V_B = 2$ V

$V_D - V_C = 10$ V

$\therefore\ V_D = 10 + V_C = 15$ V

$i_{1\Omega} = \frac{V_C - V_B}{1} = 3$ A from C to B as $V_C > V_B$

$i_{2\Omega} = \frac{V_D - V_A}{2} = 7.5$ A from D to A as $V_D > V_A$

(NEW NCERT 12th Page No. 83, 84)

(CHEMISTRY)

SECTION-A

51. (4)

According to the lowest locant rule, functional group always get the lowest position. We will give second position to alkyne.

(NEW NCERT 11th Part-II Page No. 261)

52. (2)

Aldehydes are more reactive than Ketones, and CH_3 are less bulkier than C_6H_5.

So the correct order is:

$HCHO > CH_3CHO > C_6H_5CHO > CH_3COCH_3 > C_6H_5COC_6H_5$

(NEW NCERT 12th Part-II Page No. 244)

53. (4)

List I (Species)		List II (Type of bonds)	
(A)	$(SiH_3)_3N$	(IV)	pπ- dπ bond
(B)	BF_3	(III)	pπ- pπ bond
(C)	SiO_2	(II)	sp^3-hybridisation
(D)	B_2H_6	(I)	3-centre-2-electron bond

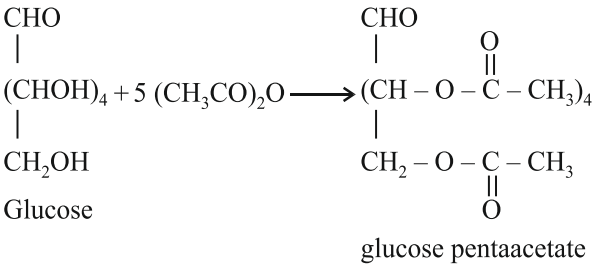
(OLD NCERT 11th Part-II Page No. 327)

54. (2)

Lassaigne's test can detect N only if the compound contains carbon with nitrogen. As hydroxylamine NH_2OH has no carbon, it does not give positive test.

(NEW NCERT 11th Part-II Page No. 284)

55. (3)



(NEW NCERT 12th Part-II Page No. 285)

56. (2)

$K_P = K_C(RT)^{\Delta n_g}$

$\Delta n_g = 1$

Since Δn_g is positive in the given reaction

$K_P > K_C$.

(NEW NCERT 11th Part-I Page No. 175)

57. (1)

(A)	IF_5	(IV)	+5
(B)	CO_2	(III)	+4
(C)	S^{2-}	(II)	–2
(D)	$H_2S_2O_8$	(I)	+6

(NEW NCERT 11th Part-II Page No. 239)

58. (2)

Here Fe is getting oxidised, so it is anode.

Cu^{2+} is reduced, it is cathode.

$\Delta G^0 = -nFE^0_{cell} = -2FE^0_{cell}$

$E^0_{Cell} = E^0_{Cathode} - E^0_{Anode} = 0.30 - 0.40$

$= -0.10$ V

$\Delta G° = -2 \times 96500\ (-0.10)$

$= 19300J = 19.3$ kJ

(NEW NCERT 12th Part-I Page No. 42)

59. (4)

In HCHO, CH_3COOH, $C_6H_{12}O_6$ all compounds have same mass % of carbon.

(NEW NCERT 11th Part-I Page No. 14)

60. (4)

Aniline itself does not undergo Friedel-craft reaction because amino group of aniline acts as base and form salt with Lewis acid $AlCl_3$.

(NEW NCERT 12th Part-II Page No. 266)

61. (2)

Breaking down of cane sugar into glucose and fructose is not first order reaction. But it is made one by increasing the concentration of one of the reactant. Hence, inversion of cane sugar is a pseudo first order reaction.

(NEW NCERT 12th Part-I Page No. 65)

62. (2)

$$\text{Reactivity of } S_N2 \propto \frac{1}{\text{Steric Hinderence}} \propto \text{Resonance}$$

(NEW NCERT 12th Part-II Page No. 164)

63. (2)

The electronic configuration of chlorine is:
$1s^2 2s^2 2p^6 3s^2 3p^5$.
The unpaired electron of Cl belongs to 3p orbital.
for p-orbitals, $l = 1$, m = –1, 0, +1
for quantum numbers of unpaired electron of chlorine are n = 3, $l = 1$, m = +1, s = $+\frac{1}{2}$

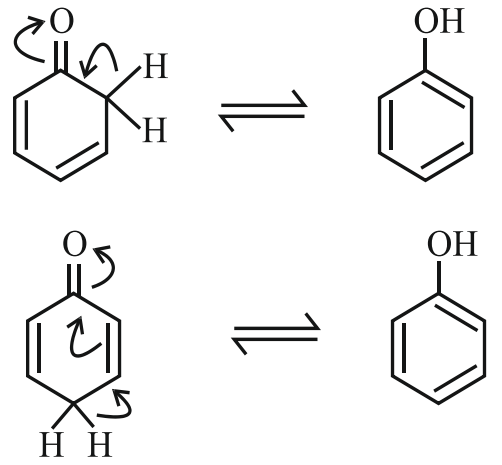
(NEW NCERT 11th Part-I Page No. 49)

64. (1)

A negative ion, an anion, is bigger than it's neutral atom. This is because it gains one or more electrons than it's neutral atom to become stable and thus its size increases. A positive ion on the other hand becomes smaller. A cation looses one or more electrons than it's neutral atoms and thus is smaller in size.

(NEW NCERT 11th Part-I Page No. 85)

65. (3)



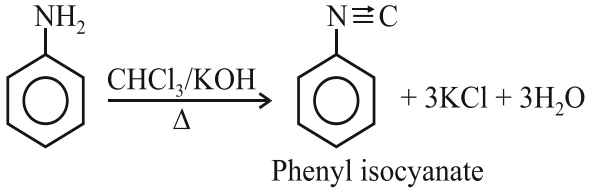
(NEW NCERT 11th Part-II Page No. 271)

66. (3)

In 3-Methylhexane, all the groups attached to chiral carbon are different so it will show optical activity.

(NEW NCERT 12th Part-II Page No. 163)

67. (1)



(NEW NCERT 12th Part-II Page No. 274)

68. (2)

For solid and liquids the value of K_P or K_C = 1
so for reaction $K_P = P^2_{NH_3}.P_{CO_2}$

(NEW NCERT 11th Part-I Page No. 174)

69. (4)

Total number of homocyclic compounds = 4
Total number of heterocyclic compounds = 3

(NEW NCERT 11th Part-II Page No. 261)

70. (1)

$\Delta H = -2 \times 10^{-3}$ cal
$\Delta S = 7$ cal/K
T = 25°C = 298K
for spontaneous reaction, ΔG must be less than zero.
$\Delta G = \Delta H - T\Delta S$
$= -2 \times 10^{-3} - (298 \times 7)$
$= -2 \times 10^{-3} - 2086$
$= -0.002 - 2086$
$\Delta G = -2086.002$

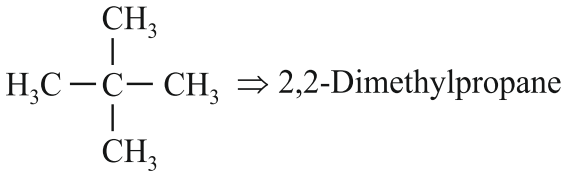
(NEW NCERT 11th Part-I Page No. 146)

71. (3)

Amalgam of mercury with sodium is an example of solid solution in which mercury (liquid) is solute and sodium is a solvent.

(NEW NCERT 12th Part-I Page No. 02)

72. (4)



(NEW NCERT 11th Part-II Page No. 264)

73. (2)

Option (2) shows intramolecular hydrogen bonding, and both (CH_3) groups are trans to each other.

(NEW NCERT 12th Part-II Page No. 199)

74. (4)

Primary alcohol can be oxidised to form aldehydes and carboxylic acids. Secondary alcohol can be oxidised to give Ketones.

(NEW NCERT 12th Part-II Page No. 237)

75. (3)

Covalent radius is half of the distance between nuclei of two atoms.

(NEW NCERT 11th Part-I Page No. 87)

76. (1)

Total energy that needed by human eye = 10^{-17} J

$$E = \frac{nhc}{\lambda}$$

$$10^{-17} = \frac{n \times 6.626 \times 10^{-34} \times 3 \times 10^{8}}{495 \times 10^{-9}}$$

$$n = \frac{1}{0.04} = 25$$

(NEW NCERT 11th Part-I Page No. 45)

77. (4)

Law of conservation of mass is not valid for nuclear reaction.

(NEW NCERT 11th Part-I Page No. 15)

78. (3)

$$NH_4OH \rightleftharpoons NH_4^+ + OH^-$$

$$NH_4Cl \rightarrow NH_4^+ + Cl^-$$

(NEW NCERT 11th Part-I Page No. 181)

79. (1)

Cr has the lowest IE value because of the shielding of 3d-electrons.

(NEW NCERT 12th Part-I Page No. 90)

80. (4)

The correct order for the reducing power is:

$CH_4 < SiH_4 < GeH_4 < SnH_4 < PbH_4$

(OLD NCERT 11th Part-II Page No. 325)

81. (2)

$$\Delta H = \Delta U + P\Delta V$$

$$-124 = \Delta U + \frac{1520}{760} \times (177 - 377) \times 10^{-3} \times 101.3$$

$$\Delta U = -83.48\,J$$

(NEW NCERT 11th Part-I Page No. 145)

82. (4)

Dimethyl dichlorosilane on hydrolysis will produce $[-O-Me_2Si-O-]_n$ which is thermoplastic polymer.

(NEW NCERT 11th Part-I Page No. 327)

83. (3)

in BrF_2^+

B.P. = 2

L.P. = 2

Total = 2 + 2 = 4

(NEW NCERT 11th Part-I Page No. 114)

84. (1)

In $K_3[Fe(CN)_6]$, the ligand has satisfied both primary and secondary valancies of ferric ion. The (+3) charge of ferric ion (primary valency) is satisfied by the negative charge on cyanide ions. The secondary valency is satisfied by six cyanide ligands.

(NEW NCERT 12th Part-I Page No. 119)

85. (4)

In the mercuration and demercuration reaction, terminal alkyne can be converted into respective ketones.

(NEW NCERT 11th Part-II Page No. 315)

SECTION-B

86. (1)

t = 6 × 60 +20

= 380 sec

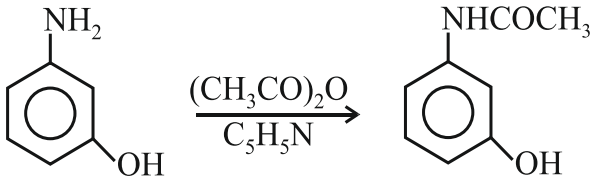
$$w = \frac{EIt}{96500}$$

$$= \frac{63.5}{2} \times \frac{2.6 \times 380}{96500}$$

w = 0.325

(NEW NCERT 12th Part-I Page No. 51)

87. (3)



(N) can easily donate its lone pain of electrons than (O).

(NEW NCERT 12th Part-II Page No. 267)

88. (3)

SO_3 contain one pπ–pπ bond and two

pπ – dπ bond.

(OLD NCERT 12th Part-I Page No. 190)

89. **(1)**

The decomposition of $KClO_3$ to KCl and O_2 on heating, is an example of intramolecular redox change.

(NEW NCERT 11th Part-II Page No. 249)

90. **(3)**

$t_{50\%} \propto (a)^{1-n}$

$t_{50\%} = z\,(a)^{1-n}$

$\log t_{50\%} = \log z + (1 - n) \log a$

$m = 1 - n$

$0 = 1 - n$

$n = 1$

(NEW NCERT 12th Part-I Page No. 72)

91. **(1)**

In Kjeldahl method, compound containing amine group are heated with Con. H_2SO_4.

Nitrogen converted into $(NH_4)_2SO_4$ and it reach with excess NaOH, NH_3 gas liberated.

(NEW NCERT 11th Part-II Page No. 285)

92. **(2)**

The geometry of XeF_4 is square planar.

(NEW NCERT 11th Part-I Page No. 120)

93. **(4)**

Scurvy is a disease cause by a lack of vitamin (C) ascorbic acid.

(NEW NCERT 12th Part-II Page No. 295)

94. **(1)**

$[Fe\,(H_2O)_5\,NO]^{2+}$

$x + 5 \times 0 + 1 = +2$

$x = +1$

$[Fe\,(CN)_5\,NO]^{2-}$

$y - 5 \times 1 + 1 = -2$

$y = +2$

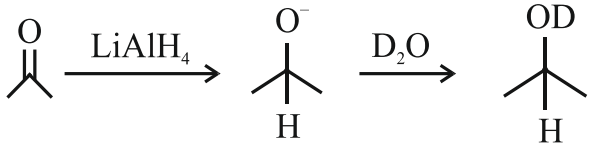
(NEW NCERT 12th Part-I Page No. 121)

95. **(3)**

Osmotic pressure is a colligative property because it depends upon the number of solute particles but not on the nature of solute.

(NEW NCERT 12th Part-I Page No. 15)

96. **(2)**



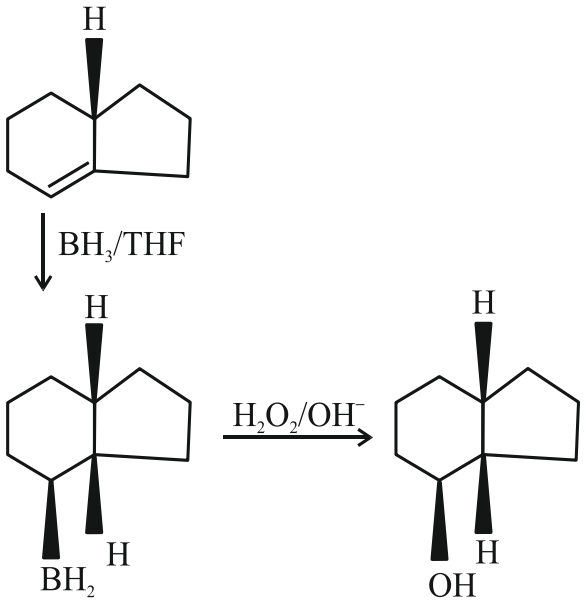
(NEW NCERT 12th Part-II Page No. 236)

97. **(1)**

Zn, Cd, Hg have fully filled (d) orbitals so they do not show the properties of d-block elements.

(OLD NCERT 12th Part-I Page No. 90)

98. **(3)**



(NEW NCERT 12th Part-II Page No. 199)

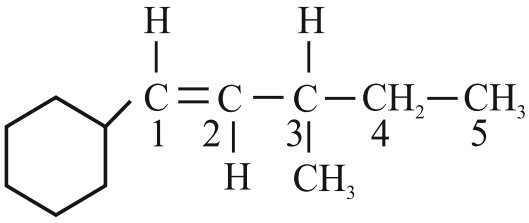
99. **(3)**

Volume is extensive property.

Pressure, density, temperature are intensive properties.

(NEW NCERT 11th Part-I Page No. 144)

100. **(3)**



(NEW NCERT 11th Part-II Page No. 262)

(BOTANY)

SECTION-A

101. (1)

Classification is the process by which anything is grouped into convenient categories based on some easily observable characters.

(NEW NCERT 11th Page No. 5)

102. (3)

R.H. Whittaker (1969) proposed a Five Kingdom Classification. The main criteria for classification used by him include cell structure, body organisation, mode of nutrition, reproduction and phylogenetic relationships.

(NEW NCERT 11th Page No. 11)

103. (4)

Sexual reproduction in algae takes place through fusion of two gametes. These gametes can be flagellated and similar in size (as in *Ulothrix*) or non-flagellated (non-motile) but similar in size (as in *Spirogyra*). Such reproduction is called isogamous. Fusion of two gametes dissimilar in size, as in species of *Eudorina* is termed as anisogamous. Fusion between one large, nonmotile (static) female gamete and a smaller, motile male gamete is termed oogamous, e.g., *Volvox*, *Fucus*.

(NEW NCERT 11th Page No. 25)

104. (2)

In symmetry, the flower may be actinomorphic (radial symmetry) or zygomorphic (bilateral symmetry). When a flower can be divided into two equal radial halves in any radial plane passing through the centre, it is said to be actinomorphic, e.g., mustard, *datura*, chilli. When it can be divided into two similar halves only in one particular vertical plane, it is zygomorphic, e.g., pea, gulmohur, bean, *Cassia*. A flower is asymmetric (irregular) if it cannot be divided into two similar halves by any vertical plane passing through the centre, as in canna.

(NEW NCERT 11th Page No. 62)

105. (4)

When xylem and phloem within a vascular bundle are arranged in an alternate manner along the different radii, the arrangement is called radial such as in roots. In conjoint type of vascular bundles, the xylem and phloem are jointly situated along the same radius of vascular bundles. Such vascular bundles are common in stems and leaves.

(NEW NCERT 11th Page No. 73)

106. (1)

The endomembrane system includes endoplasmic reticulum (ER), golgi complex, lysosomes and vacuoles. Since the functions of the mitochondria, chloroplast and peroxisomes are not coordinated with the above components, these are not considered as part of the endomembrane system.

(NEW NCERT 11th Page No. 95)

107. (3)

During anaphase, centromeres split and chromatids separate. Chromatids move to opposite poles. The centromere of each chromosome remains directed towards the pole and the arms of the chromosome trailing behind.

(NEW NCERT 11th Page No. 123, 124)

108. (2)

Cladophora was placed in a suspension of aerobic bacteria to detect the sites of O_2 evolution.

(NEW NCERT 11th Page No. 135)

109. (2)

NADH $\rightarrow$ FMN	NADH dehydrogenase
Cyt $b \rightarrow$ Fe-S $\rightarrow$ Cyt c_1	Complex III
Cyt $a \rightarrow$ Cyt a_3	Cytochrome c oxidase
ATP synthase	Complex V

(NEW NCERT 11th Page No. 161)

110. (3)

Dormin	General plant growth inhibitor
Kinetin	Cytokinesis promoting active
Ethylene	Volatile substance
Gibberellic acid	Causes 'bakanae' disease of rice seedlings

(NEW NCERT 11th Page No. 175)

111. (4)

Pollen-pistil interaction involves all events from the landing of pollen grains on the stigma until the pollen tube enters the embryo sac (when the pollen is compatible) or pollen inhibition (when the pollen is incompatible).

(NEW NCERT 12th Page No. 24)

112. (3)

To determine the genotype of a tall plant at F_2, Mendel crossed the tall plant from F_2 with a dwarf plant. This he called a test cross. In a typical test cross an organism (pea plants here) showing a dominant phenotype (and whose genotype is to be determined) is crossed with the recessive parent instead of self-crossing.

(NEW NCERT 12th Page No. 58)

113. (2)

A nucleotide has three components – a nitrogenous base, a pentose sugar (ribose in case of RNA, and deoxyribose for DNA), and a phosphate group. There are two types of nitrogenous bases – Purines (Adenine and Guanine), and Pyrimidines (Cytosine, Uracil and Thymine). Cytosine is common for both DNA and RNA and Thymine is present in DNA. Uracil is present in RNA at the place of Thymine.

(NEW NCERT 12th Page No. 80)

114. (2)

Streptokinase produced by the bacterium *Streptococcus* and modified by genetic engineering is used as a 'clot buster' for removing clots from the blood vessels of patients who have undergone myocardial infarction leading to heart attack.

(NEW NCERT 12th Page No. 153)

115. (2)

Dead plant remains such as leaves, bark, flowers and dead remains of animals, including fecal matter, constitute detritus, which is the raw material for decomposition.

(NEW NCERT 12th Page No. 207)

116. (3)

The consumers that feed on these herbivores are carnivores, or more correctly primary carnivores (though secondary consumers). Those animals that depend on the primary carnivores for food are labelled secondary carnivores.

(NEW NCERT 12th Page No. 209)

117. (1)

Careful analysis of records shows that extinctions across taxa are not random; some groups like amphibians appear to be more vulnerable to extinction.

(NEW NCERT 12th Page No. 222)

118. (2)

The veins vary in thickness in the reticulate venation of the dicot leaves.

(NEW NCERT 11th Page No. 77)

119. (2)

Schleiden and Schwann together formulated the cell theory. This theory however, did not explain as to how new cells were formed. Rudolf Virchow (1855) first explained that cells divided and new cells are formed from pre-existing cells (*Omnis cellula-e cellula*). He modified the hypothesis of Schleiden and Schwann to give the cell theory a final shape.

(NEW NCERT 11th Page No. 88)

120. (4)

In oocytes of some vertebrates, diplotene can last for months or years.

(NEW NCERT 11th Page No. 126)

121. (1)

Photosystem I (PS I) and Photosystem II (PS II) are named in the sequence of their discovery, and not in the sequence in which they function during the light reaction.

(NEW NCERT 11th Page No. 138)

122. (1)

During the conversion of succinyl-CoA to succinic acid a molecule of GTP is synthesised.

(NEW NCERT 11th Page No. 159)

123. (2)

Development in plants (i.e., both growth and differentiation) is under the control of intrinsic and extrinsic factors. The former includes both intracellular (genetic) or intercellular factors (chemicals such as plant growth regulators) while the latter includes light, temperature, water, oxygen, nutrition, etc.

(NEW NCERT 11th Page No. 174)

124. (1)

Part of gynoecium	Post-fertilisation structure
PEN	Endosperm
Zygote	Embryo
Ovule	Seed
Ovary	Fruit

(NEW NCERT 12th Page No. 18, 19, 20, 21)

125. (2)

The inheritance of flower colour in the dog flower (snapdragon or *Antirrhinum* sp.) is a good example to understand incomplete dominance.

(NEW NCERT 12th Page No. 60)

126. (1)

Francis Crick proposed the Central dogma in molecular biology, which states that the genetic information flows from DNA $\rightarrow$ RNA $\rightarrow$ Protein.

(NEW NCERT 12th Page No. 82)

127. (3)

Biological control methods adopted in agricultural pest control are based on the ability of the predator to regulate prey population.

(NEW NCERT 12th Page No. 198)

128. (1)

Among multicellular organisms, human red blood cells are about 7.0 μm in diameter.

(NEW NCERT 11th Page No. 88, 89)

129. (3)

While the membrane or lamellae of the grana have both PS I and PS II the stroma lamellae membranes lack PS II as well as NADP reductase enzyme.

(NEW NCERT 11th Page No. 140)

130. (4)

In both lactic acid and alcohol fermentation not much energy is released; less than seven per cent of the energy in glucose is released and not all of it is trapped as high energy bonds of ATP. Also, the processes are hazardous – either acid or alcohol is produced.

(NEW NCERT 11th Page No. 157)

131. (1)

Pollination by wind is more common amongst abiotic pollinations. Wind pollination also requires that the pollen grains are light and non-sticky so that they can be transported in wind currents. They often possess well-exposed stamens (so that the pollens are easily dispersed into wind currents) and large often-feathery stigma to easily trap air-borne pollen grains. Wind-pollinated flowers often have a single ovule in each ovary and numerous flowers packed into an inflorescence; a familiar example is the corn cob – the tassels you see are nothing but the stigma and style which wave in the wind to trap pollen grains. Wind-pollination is quite common in grasses.

(NEW NCERT 12th Page No. 13)

132. (4)

In the dihybrid cross, the phenotypes round, yellow; wrinkled, yellow; round, green and wrinkled, green appeared in the ratio 9:3:3:1. Such a ratio was observed for several pairs of characters that Mendel studied. The ratio of 9:3:3:1 can be derived as a combination series of 3 yellow: 1 green, with 3 round : 1 wrinkled. One out of 16 pea seeds were green and wrinkled i.e;

$$\frac{1}{16} \times 100 = 6.25\%$$

(NEW NCERT 12th Page No. 64)

133. (4)

The negatively charged DNA is wrapped around the positively charged histone octamer to form a structure called nucleosome.

(NEW NCERT 12th Page No. 83)

134. (2)

Brown-body, red-eye are the dominant wild type traits of *Drosophila melanogaster*. (Refer figure 4.10)

(NEW NCERT 12th Page No. 67)

135. (4)

The S strain bacteria have a mucous (polysaccharide) coat, while R strain does not. Mice infected with the S strain (virulent) die from pneumonia infection but mice infected with the R strain do not develop pneumonia. Griffith was able to kill bacteria by heating them. He observed that heat-killed S strain bacteria injected into mice did not kill them.

(NEW NCERT 12th Page No. 84)

SECTION-B

136. (2)

Certain marine red algae produce large amounts of hydrocolloids called carrageen.

(NEW NCERT 11th Page No. 26)

137. (3)

In alternate type of phyllotaxy, a single leaf arises at each node in alternate manner, as in china rose, mustard and sun flower plants. In opposite type, a pair of leaves arise at each node and lie opposite to each other as in *Calotropis* and guava plants.

(NEW NCERT 11th Page No. 61)

138. (2)

The monocot stem has a sclerenchymatous hypodermis (dead tissue), a large number of scattered vascular bundles, each surrounded by a sclerenchymatous bundle sheath, and a large, conspicuous parenchymatous ground tissue.

(NEW NCERT 11th Page No. 76)

139. (3)

Golgi apparatus	Concentrically arranged near the nucleus
Lysosomes	Rich in hydrolytic enzymes
Mitochondria	Inner membrane forms a number of infoldings
Plastids	Pigment bearing organelles in plants

(NEW NCERT 11th Page No. 95, 96, 97)

140. (1)

Mitosis accomplishes not only the segregation of duplicated chromosomes into daughter nuclei (karyokinesis), but the cell itself is divided into two daughter cells by the separation of cytoplasm called cytokinesis at the end of which cell division gets completed. In an animal cell, this is achieved by the appearance of a furrow in the plasma membrane. The furrow gradually deepens and ultimately joins in the centre dividing the cell cytoplasm into two. Plant cells however, are enclosed by a relatively inextensible cell wall, therefore they undergo cytokinesis by a different mechanism. In plant cells, wall formation starts in the centre of the cell and grows outward to meet the existing lateral walls. The formation of the new cell wall begins with the formation of a simple precursor, called the cell-plate that represents the middle lamella between the walls of two adjacent cells.

(NEW NCERT 11th Page No. 124)

141. (3)

Within the chloroplast, protons in the stroma decrease in number, while in the lumen there is increase in the number of protons. The pH of the lumen decreases. CF_0 is embedded in the thylakoid membrane and forms a transmembrane channel that carries out facilitated diffusion of protons across the membrane.

(NEW NCERT 11th Page No. 141, 142)

142. (3)

Animals obtain food from plants directly (herbivores) or indirectly (carnivores).

(NEW NCERT 11th Page No. 153, 154)

143. (3)

Cytokinins promote nutrient mobilisation which helps in the delay of leaf senescence.

(NEW NCERT 11th Page No. 177)

144. (1)

Geitonogamy is the transfer of pollen grains from the anther to the stigma of another flower of the same plant. Although geitonogamy is functionally cross-pollination involving a pollinating agent, genetically it is similar to autogamy since the pollen grains come from the same plant.

(NEW NCERT 12th Page No. 12)

145. (4)

Thalassemia is a mendelian disease which is an autosome-linked recessive trait. The defect could be due to either mutation or deletion which ultimately results in reduced rate of synthesis of one of the globin chains (α and β chains) that make up haemoglobin. This causes the formation of abnormal haemoglobin molecules resulting into anaemia.

(NEW NCERT 12th Page No. 75)

146. (1)

The DNA-dependent DNA polymerases catalyse polymerisation only in one direction, that is 5' → 3'. This creates some additional complications at the replicating fork. Consequently, on one strand (the template with polarity 3' → 5'), the replication is continuous, while on the other (the template with polarity 5' → 3'), it is discontinuous. The discontinuously synthesised fragments are later joined by the enzyme DNA ligase.

(NEW NCERT 12th Page No. 90)

147. (2)

Micro-organisms such as *Lactobacillus* and others commonly called lactic acid bacteria (LAB) grow in milk and convert it to curd. During growth, the LAB produce acids that coagulate and partially digest the milk proteins. A small amount of curd added to the fresh milk as inoculum or starter contain millions of LAB, which at suitable temperatures multiply, thus converting milk to curd, which also improves its nutritional quality by increasing vitamin B_{12}. In our stomach too, the LAB play very beneficial role in checking disease-causing microbes.

(NEW NCERT 12th Page No. 151)

148. (2)

The value of intrinsic rate of natural increase for the Norway rat the r is 0.015, and for the flour beetle it is 0.12. In 1981, the r value for human population in India was 0.0205.

(NEW NCERT 12th Page No. 194)

149. (1)

Pyramid of biomass in sea	Generally inverted
Pyramid of energy	Always upright
Pyramids, of number, of energy and biomass in most ecosystems	Usually upright

(NEW NCERT 12th Page No. 213)

150. (3)

Species diversity is the diversity at the species level, for example, the Western Ghats have a greater amphibian species diversity than the Eastern Ghats.

(NEW NCERT 12th Page No. 217)

(ZOOLOGY)

SECTION-A

151. (3)

Respiration which occurs through gills is known as branchial respiration. Snail, Shark, Katla and Prawn respires by gills whereas Dolphin and Whale respires by lungs.

(**NEW NCERT 11th Page No. 45, 48)**

152. (2)

'Saheli'–a new oral contraceptive for the females– was developed by scientists at Central Drug Research Institute (CDRI) in Lucknow, India.

(NEW NCERT 12th Page No. 42)

153. (4)

Flagellar movement helps in the swimming of spermatozoa, maintenance of water current in the canal system of sponges and in locomotion of Protozoans like *Euglena.* In *Paramoecium*, cilia helps in the movement of food through cytopharynx and in locomotion as well.

(NEW NCERT 11th Page No. 217, 218)

154. (2)

Ammonia produced by metabolism is converted into urea in the liver of mammals and released into the blood which is filtered and excreted out by the kidneys.

(**NEW NCERT 11th Page No. 205)**

155. (4)

Thrombokinase, Thrombocytes and Calcium ions are involved in coagulation of blood while Globulins primarly are involved in defense mechanisms of the body.

(**NEW NCERT 11th Page No. 194, 196)**

156. (3)

The abdomen in both males and females cockroach consists of 10 segments.

(**Old NCERT 11th Page No. 112)**

157. (2)

Based on observations made during a sea voyage in a sail ship called H.M.S. Beagle round the world, Charles Darwin concluded that existing living forms share similarities to varying degrees not only among themselves but also with life forms that existed millions of years ago.

(NEW NCERT 12th Page No. 112)

158. (2)

The thymus gland is a lobular structure located between lungs behind sternum on the ventral side of aorta. The thymus plays a major role in the development of the immune system.

(NEW NCERT 11th Page No. 243)

159. (2)

Gene cloning means making multiple copies of any template DNA. In this technique a gene of interest is located and copied (cloned) out of all the DNA extracted from an organism.

(**NEW NCERT 12th Page No. 164)**

160. (3)

The human male ejaculates about 200 to 300 million sperms during a coitus of which, for normal fertility, at least 60 per cent sperms must have normal shape and size and at least 40 per cent of them must show vigorous motility.

(NEW NCERT 12th Page No. 32)

161. (2)

Plant cell walls are made up of cellulose. Cellulose is a polymeric polysaccharide consisting of only one type of monosaccharide i.e., glucose.

(NEW NCERT 11th Page No. 111)

162. (2)

α-interferon are biological response modifiers, given to cancer patient which activates their immune system and helps in destroying the tumor.

(NEW NCERT 12th Page No. 142)

163. (3)

The diffusion membrane is made up of three major layers namely, the thin squamous epithelium of alveoli, the endothelium of alveolar capillaries and the basement substance. The squamous epithelium is single layered thick.

(NEW NCERT 11th Page No. 188)

164. (4)

GM has been used to create tailor-made plants to supply alternative resources to industries, in the form of starches, fuels and pharmaceuticals.

(NEW NCERT 12th Page No. 179)

165. (2)

Exoskeletons of arthropods, for example, have a complex polysaccharide called chitin. These complex polysaccharides are mostly homopolymers.

(NEW NCERT 11th Page No. 111)

166. (2)

Bombyx, *Pristis*, *Rana* and *Sepia* are bilaterally symmetrical in their adult stage. *Ophiura* and *Echinus* are radially symmetrical in adult stage.

(NEW NCERT 11th Page No. 44, 45, 47, 48)

167. (4)

The axon in the neuron is a long fibre, the distal end of which is branched. Each branch terminates as a bulb-like structure called synaptic knob which possess synaptic vesicles containing chemicals called neurotransmitters.

(NEW NCERT 11th Page No. 232)

168. (3)

'Nirodh' is a popular brand of condom for the male. Saheli is the oral contraceptive used by female. Lippes loop is non medicated IUD used by female as contraceptive device. Implants are used by females under skin as a method of birth control.

(NEW NCERT 12th Page No. 44, 45)

169. (1)

The number of wrist bones in a forelimb of an adult man is 8. Cranial bone is also 8 in number. Thoracic vertebrae is 12. Sternum is one in number and palm bone is 5 in number. Ear ossicles is 6 and false ribs is 6 in number.

(NEW NCERT 11th Page No. 225, 226)

170. (1)

Erythrocytes, leucocytes and platelets are collectively called formed elements. Erythrocytes or RBC play a significant role in transport of respiratory gases. RBCs are devoid of nucleus in most of the mammals and are biconcave in shape.

(NEW NCERT 11th Page No. 194)

171. (1)

During follicular phase, the primary follicles in the ovary grow to become a fully mature Graafian follicle and simultaneously the endometrium of uterus regenerates through proliferation. The ovulation (ovulatory phase) is followed by the luteal phase during which the remaining parts of the Graafian follicle transform as the corpus luteum.

(**NEW NCERT 12th Page No. 34, 35)**

172. (2)

The exaggerated response of the immune system to certain antigens present in the environment is called allergy. The substances to which such an immune response is produced are called allergens. Allergy is due to the release of chemicals like histamine and serotonin from the mast cells.

(**NEW NCERT 12th Page No. 137)**

173. (3)

Each restriction endonuclease functions by 'inspecting' the length of a DNA sequence. Once it finds its specific recognition sequence, it will bind to the DNA and cut each of the two strands of the double helix at specific points in their sugar-phosphate backbones.

(**NEW NCERT 12th Page No. 166)**

174. (3)

Petromyzon belongs to class Cyclostomata, they have a sucking and circular mouth without jaws. Cranium and vertebral column are cartilaginous. Circulation is of closed type. Cyclostomes are marine but migrate for spawning to fresh water. After spawning, within a few days, they die.

(NEW NCERT 11th Page No. 47)

175. (4)

If gene migration happens multiple times then it is called gene flow. It is the transfer of genetic material from one population to another. Gene flow can take place between two populations of the same species through migration, and is mediated by reproduction and vertical gene transfer from parent to offspring.

(**NEW NCERT 12th Page No. 121)**

176. (3)

The side-effects of the use of anabolic steroids in females include masculinisation (features like males), increased aggressiveness, mood swings, depression, abnormal menstrual cycles, excessive hair growth on the face and body, enlargement of clitoris, deepening of voice.

(NEW NCERT 12th Page No. 146)

177. (4)

The cloaca is a small, median chamber that is used to pass faecal matter, urine and sperms to the exterior. Male reproductive organs consist of a pair of yellowish ovoid testes. External ear is absent in frogs and only tympanum can be seen externally.

(**NEW NCERT 11th Page No. 83, 84)**

178. (4)

Vascularised bags called lungs (pulmonary respiration) are used by the terrestrial forms for the exchange of gases. Among vertebrates, fishes use gills whereas amphibians, reptiles, birds and mammals respire through lungs.

(NEW NCERT 11th Page No. 183)

179. (3)

Examples of divergent evolution are: Forelimbs of whales, bats, Cheetah and human, vertebrate hearts or brains, thorn and tendrils of *Bougainvillea* and *Cucurbita*, Darwin finches. Examples of convergent evolution are: Wings of butterfly and birds, eye of the octopus and of mammals or the flippers of Penguins and Dolphins, Sweet potato (root modification) and potato (stem modification).

(NEW NCERT 12th Page No. 114, 115)

180. (3)

Blood is a special connective tissue consisting of a fluid matrix, plasma, and formed elements. Plasma constituting nearly 55 per cent of the blood. Erythrocytes, leucocytes and platelets are collectively called formed elements and they constitute nearly 45 per cent of the blood.

(NEW NCERT 11th Page No. 193)

181. (2)

During fertilisation, a sperm comes in contact with the zona pellucida layer of the ovum and induces changes in the membrane that block the entry of additional sperms. Thus, it ensures that only one sperm can fertilise an ovum.

(NEW NCERT 12th Page No. 35)

182. (4)

Based on the number of axon and dendrites, the neurons are divided into three types, i.e., multipolar (with one axon and two or more dendrites; found in the cerebral cortex), bipolar (with one axon and one dendrite, found in the retina of eye) and unipolar (cell body with one axon only; found usually in the embryonic stage).

(NEW NCERT 11th Page No. 232)

183. (2)

The spermatogonia multiply by mitotic division and increase in numbers. Some of the spermatogonia called primary spermatocytes periodically undergo meiosis. A primary spermatocyte completes the first meiotic division (reduction division) leading to formation of two equal, haploid cells called secondary spermatocytes. The secondary spermatocytes undergo the second meiotic division to produce four equal, haploid spermatids. The spermatids are transformed into spermatozoa (sperms) by the process called spermiogenesis. So, 40 sperms are formed then 20 secondary spermatocytes have completed the meiosis.

(**NEW NCERT 12th Page No. 31)**

184. (4)

By the time of 500 mya, invertebrates were formed and active. Jawless fish probably evolved around 350 mya. Sea weeds and few plants existed probably around 320 mya. Some of the land reptiles went back into water to evolve into fish like reptiles probably 200 mya (e.g. *Ichthyosaurs*).

(NEW NCERT 12th Page No. 122)

185. (3)

Hormones which interact with intracellular receptors [steroid hormones (e.g., cortisol, testosterone, estradiol and progesterone), iodothyronines (thyroid hormones), etc.] mostly regulate gene expression or chromosome function by the interaction of hormone-receptor complex with the genome.

(NEW NCERT 11th Page No. 248)

SECTION-B

186. (3)

In AIDS progressive decrease in the number of helper T-lymphocytes in the body of the infected person occurs. During this period, the person suffers from bouts of fever, diarrhoea and weight loss. Appearance of dry, scaly lesions on various parts of the body such as skin, nails and scalp are the main symptoms of ringworm. In filariasis, inflammation occurs in lower limbs. Symptoms of amoebiasis include internal bleeding, muscular pain, fever, anemia and blockage of the intestinal passage.

(NEW NCERT 12th Page No. 133, 140)

187. (1)

The excretory system in frog consists of a pair of kidneys, ureters, cloaca and urinary bladder. Each kidney is composed of several structural and functional units called uriniferous tubules or nephrons.

(NEW NCERT 11th Page No. 82)

188. (4)

The grounds for termination of pregnancies are:

(i) The continuation of the pregnancy would involve a risk to the life of the pregnant woman or of grave injury physical or mental health; or

(ii) There is a substantial risk that of the child were born, it would suffer from such physical or mental abnormalities as to be seriously handicapped.

(NEW NCERT 12th Page No. 46)

189. (4)

Balanoglossus belongs to phylum Hemichordata, Their body is cylindrical and is composed of an anterior proboscis, a collar and a long trunk. They are triploblastic.

(**NEW NCERT 11th Page No. 44, 45, 48)**

190. (1)

List-I	List-II
Homo erectus	Large brain around 900 cc
Neanderthal man	Buried their dead
Australopithecines	Hunted with stone weapons
Homo sapiens	Arose during ice age

(NEW NCERT 12th Page No. 124, 125)

191. (1)

In closed circulatory system**,** the blood pumped by the heart is always circulated through a closed network of blood vessels. This pattern is considered to be more advantageous as the flow of fluid can be more precisely regulated.

(NEW NCERT 11th Page No. 197)

192. (3)

Trypsin is a protein which acts as an enzyme. Insulin is a polypeptide hormone. GLUT-4 enable glucose transporter into cell. Collagen is intercellular ground substance.

(**NEW NCERT 11th Page No. 109)**

193. (2)

Blood is a special connective tissue consisting of a fluid matrix, plasma, and formed elements. A special case of Rh incompatibility (mismatching) has been observed between the Rh^{-ve} blood of a pregnant mother with Rh^{+ve} blood of the foetus. Each peak in the ECG is identified with a letter from P to T that corresponds to a specific electrical activity of the heart.

(NEW NCERT 11th Page No. 193, 196, 201)

194. (1)

Lower invertebrates like sponges, coelenterates, flatworms, etc., exchange O_2 with CO_2 by simple diffusion over their entire body surface. Special vascularised structures called gills (branchial respiration) are used by most of the aquatic arthropods and molluscs.

(**NEW NCERT 11th Page No. 183)**

195. (2)

NaCl is transported by the ascending limb of Henle's loop which is exchanged with the descending limb of vasa recta. NaCl is returned to the interstitium by the ascending portion of vasa recta.

(**NEW NCERT 11th Page No. 211)**

196. (1)

Myasthenia gravis is an auto immune disorder affecting neuromuscular junction leading to fatigue, weakening and paralysis of skeletal muscle.

(NEW NCERT 11th Page No. 227)

197. (3)

The human brain is well protected by the skull. Inside the skull, the brain is covered by cranial meninges consisting of an outer layer called dura mater, a very thin middle layer called arachnoid and an inner layer (which is in contact with the brain tissue) called pia mater.

(NEW NCERT 11th Page No. 235)

198. (3)

Insulin acts mainly on hepatocytes and adipocytes (cells of adipose tissue), and enhances cellular glucose uptake and utilisation. Cortisol stimulates the RBC production. Thyroid hormones control the metabolism of carbohydrates, proteins and fats. Maintenance of water and electrolyte balance is also influenced by thyroid hormones. Thymosins also promote production of antibodies to provide humoral immunity.

(**NEW NCERT 11th Page No. 243, 245)**

199. (4)

Biotechnology deals with large scale production and marketing of products and processes using live organisms, cells or enzymes from organisms to produce products and processes useful to humans. Biotechnology using genetically modified organisms was made possible only when man learnt to alter the chemistry of DNA and construct recombinant DNA.

(NEW NCERT 12th Page No. 175)

200. (3)

For effective treatment of a disease, early diagnosis and understanding its pathophysiology is very important.

(NEW NCERT 12th Page No. 182)

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